

TREATMENT OF EFFLUENTS CONTAINING 2-CHLOROPHENOL BY ADSORPTION ONTO CHEMICALLY AND PHYSICALLY ACTIVATED BIOCHARS

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Abstract

The application of adsorption using biochars for the remediation of effluents containing emerging contaminants, including chlorophenols, is a hotspot and trend development in the literature. This treatment is more interesting when using readily available wastes and at no cost, such as malt bagasse, for example. Here, the biochars were produced from malt bagasse, by physical and chemical activation (with CO₂ and ZnCl₂, respectively) and employed as adsorbents in the remediation of effluents containing 2-chlorophenol. Results revealed that the activated biochars have mesoporous structures and surface areas of 161 m² g⁻¹ (CO₂) and 545 m² g⁻¹ (ZnCl₂). For both activated biochars, adsorption of 2-chlorophenol was favored under acid conditions, with the highest adsorption capacities found using ZnCl₂-activated biochar. The maximum adsorption capacity using ZnCl₂-activated biochar was 150 mg g⁻¹. The process was endothermic and spontaneous. ZnCl₂-activated biochar exhibited an efficiency of 98 % (using a dosage of 10 g L⁻¹) in the treatment of industrial effluents containing 2-chlorophenol.

Keywords

2-chlorophenol; Adsorption; Biochar; Malt bagasse; Pyrolysis